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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,330	02/14/2002	Jyhchau Horng	MH-5092	8692

7590   04/21/2005

Patent Department
Mitsubishi Electric Research Laboratories, Inc.
201 Broadway
Cambridge, MA   02139

EXAMINER
FILE, ERIN M

ART UNIT	PAPER NUMBER
2634	

DATE MAILED: 04/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<table>
<tr><td rowspan="3">Office Action Summary</td><td>Application No.</td><td>Applicant(s)</td><td></td></tr>
<tr><td>10/075,330</td><td>HORNG ET AL.</td><td></td></tr>
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	Examiner	Art Unit	
	Erin M. File	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>*14 February 2002*</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>*1-5*</u> is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>*1-5*</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>*2/14/2002*</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☐ All b)☐ Some * c)☐ None of:

   1.☐ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>*2/14/2002*</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____ .

Specification

1.   The disclosure is objected to because of the following informalities: the recitation

on page 4, line 12, "Figure 1 is a block diagram of components of a receiver that can

use the invention", similarly, on page 5, line 14, the specification recites "Figure 1 shows

some of the components of a receiver 100 that can use the invention". Both of these

statements are grammatically incorrect and require correction.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Chow et al. and in further view of Kim.

Claim 1, Chow discloses repeatedly sending a training sequence through the channel

to the receiver, using the equalizer parameters, the received sequence, and a local

replica of the training sequence to update a set of channel target response parameters,

windowing the channel target response parameters, using the channel target response

parameters, the received sequence and the local replica to update the equalizer

parameters, and windowing the equalizer parameters. This training process is repeated

until a predetermined convergence condition is detected (col. 5, line 60 – col. 6 lines 2).

Chow further discloses the equalizer update method includes the use of a circular buffer

for updating equalizer taps (col. 8, lines 51-66). Chow further discloses that generally

this loop is repeated either until the error falls below a predetermined threshold (col. 7,

lines 51-55). Chow fails to use mean square error estimation in his invention. However,

Chow does use the less computationally efficient method of least mean square (LMS)

error estimation. Kim discloses an equalization apparatus in which a mean squared

error estimation is used (col. 4, lines 20-24). Because a mean squared error estimation

is more computationally efficient than least mean squares estimation it would have been

obvious to one skilled in the art a the time of invention to incorporate Kim's mean

squared error estimation method into Chow's invention.

Claim 2, inherits the limitation of Claim 1. Chow does not disclose expressly disclose

that the number of symbols in the training sequence is less than five. At the time the

invention was made, it would have been obvious to a person of ordinary skill in the art to

use a sequence of training symbols of five or less. Applicant has not disclosed that the

specific value of five or less training symbols provides an advantage, is used for a

particular purpose, or solves a stated problem. One of ordinary skill in the art,

furthermore, would have expected Applicant's invention to perform equally well with

Chow's invention because the use of five ore less training symbols may be an adequate

number of symbols for convergence in a equalizer with training signal circulation, which

is the motivation for the use of fewer training symbols disclosed in the application (p. 5,

lines 1-3). Therefore, it would have been obvious to one of ordinary skill in this art to

modify Chow.

Claim 3, inherits the limitations of Claim 1. Chow further discloses a loop that is

repeated either until the error falls below a predetermined threshold (col. 7, lines 51-53).

Chow fails to disclose that the threshold is a target mean square error, as Chow uses a

least mean squares error estimate, however, Kim uses a least mean squares error

estimation technique, the motivation for this substitution is included in Claim 1 above.

Claim 4, contains the limitations of Claim 1. Further, Chow fails to disclose a switch

controlled by the circulation trigger which switches from feeding the training signal to the

equalization and decision device during training stages and feeding the input signal to

the equalization and decision device during an equalization stage. However, Kim

discloses an equalizer adaptation method in which two memories are used, a first

memory, (fig. 1, 21) and a second memory (25), in combination with a multiplexer (23),

and a mode selection circuit (26). Kim's apparatus stores in the first memory predicted

filtered data samples for the equalizer in the form of a lookup table (col. 3, lines 32-47).

In the second memory values from the actual received data error is stored (col. 3 line 63

– col. 4, line 4). The mode selection circuit (26) chooses between the memory values

which will be used for the equalizer coefficients and inputs that the decision to the

multiplexer (23) based upon whether mean squared error is below a threshold value

(col. 4, lines 30-37). This method of using training signals until a steady state is realized

would be obvious to incorporate into Chow's invention because Chow discusses using

the circular training signals until a threshold of convergence is reached. Therefore it

would be obvious to one skilled in the art at the time of invention to incorporate Kim's

selection method into Chow's apparatus.

Claim 5, inherits the limitations of claim 4. As discussed in Claims 1 and 3, Chow

discloses means for determining if the mean square error is greater than a

predetermined threshold, and minimizing the mean square error of the circulating

training signal and the estimate of the training signal until the mean square error is less

than the predetermined threshold. Further, Kim's discloses using the input signal and

not the training signal to equalize the signal if the mean squared error is below a

specific threshold as discussed in Claim 4.

4.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Erin M. File whose telephone number is (571)272-6040.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Stephen Chin can be reached on (571)272-3056. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

Erin M. File

EMF

4/15/2005

STEPHEN CHIN
SUPERVISORY PATENT EXAMINE:
TECHNOLOGY CENTER 2600